

BOOK REVIEW BY KEN PHILLIPS

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### **A Concise History of Solar and Stellar Physics**

Jean-Louis Tassoul and Monique Tassoul

*Princeton University Press, Princeton, NJ, 2004. \$39.95 (282 pp.)*

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*Reviewed by Kenneth J. H. Phillips*

There is no doubt that the awareness of the often long history and its principal players of a scientific specialty is disappearing among present-day researchers. The reason is the inexorable rise of specialization, in which scientists are expected to keep pace with publications in their own field, not to mention the inevitable round of writing grant proposals and teaching and other mundane responsibilities. The authors of this small book had the intention of rectifying this for solar and stellar physics, disciplines which are still broad enough to embrace fields as diverse as nuclear fusion, magneto-hydrodynamics, and the dynamic theory of gas spheres. They take the reader on a journey from ancient Greek and middle Eastern astronomy to the late 1990s, one which has an emphasis very much on a theoretical point of view. For the authors, it is the ideas that are central, not the observations.

This is very natural for the earlier part of the book where all of observational astronomy relied on the keenness of people's eyesight, long before Galileo turned his telescope to the skies. The opening chapter on ancient astronomical ideas is marvelously written, the best I have read on the subject since I plowed my way through Dreyer's monumental *History of Astronomy* some years ago. You really get a sense of the role of accident in history, the way Aristarchus's heliocentric universe was discarded by Aristotle so paving the way for the Church's uncompromising acceptance of the earth being at the center of everything and the shaping of European astronomy till the coming of Galileo and Copernicus. The full account of Babylonian contributions to the subject including the not-so-well-known names associated with them was very gratifying, forming a balance with the European contributions.

Like any good historical account, from the time of Gibbon onwards, there are lavish footnotes that are not distracting but at the same time very informative. Indeed, the footnotes are sometimes crucial – the one about magnetohydrodynamics and the formation of solar flares is almost the only mention there is in the book about this important subject. I was very distressed to see not a single mention of stellar flares, a subject with a venerable history since the discovery of dwarf star optical flares and simultaneous radio flares by Lovell at Jodrell Bank. In a treatise on solar and stellar astronomy, I would have expected a full account of the different types of flare stars and ideas of their origins. This was a serious omission.

As mentioned, the book is taken very much from a theoretical point of view. You will look in vain for some of the epochal observational landmarks, for example many spacecraft findings over the past 40 years. In fact, there is hardly a mention of *International Ultraviolet Explorer*, *Skylab*, or even *Hubble Space Telescope*, all of which have been used to make fundamental discoveries about the sun and stars.

I find it interesting to see different perspectives on what constitutes a “golden age” of a subject. For black hole research, Kip Thorne asserts in his book on Black Holes, it lasted a mere decade, starting from the mid-1960s. For the authors of this book, the “Golden Age” of stellar and solar astronomy research was the thirty year period starting from 1940. Was it so golden? To be sure, a great many discoveries, ranging from stellar population types, arising from Shapley’s work on globular clusters in the wartime darkened skies of Los Angeles, to that of pulsars, were made then. But surely the discoveries continued well into the Seventies, Eighties and Nineties with the dramatically improved view of solar and stellar atmospheres from spacecraft ultraviolet and X-ray instruments. *Skylab* images of solar coronal holes and the chromospheric network formed just the beginning of a new understanding of the solar wind and the role of the sun in the heliosphere. *IUE* observations led to a much clearer understanding of the role of the outer convection zones and rotation in stellar activity and dynamos. Notwithstanding, the authors label the time since 1970, pessimistically, as merely the “Age of Specialization”, when there are no longer giants writing monographs in the subject, only lots of multi-author papers written by people all clambering to get the allusive permanent job opening.

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